

## TORREYA

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## Contributions to the Flora of New Jersey

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Recent collecting in various parts of New Jersey has led to the preparation of the present report. Names of herbaria are abbreviated as (BH) Bailey Hortorium of Cornell University, (Claus) private herbarium of R. T. Clausen, (Corn) herbarium of the Department of Botany of Cornell University, (Edw) private herbarium of J. L. Edwards, (NY) herbarium of the New York Botanical Garden, and (Ph) herbarium of the Academy of Natural Sciences of Philadelphia. Collectors most frequently mentioned are indicated as *C*, R. T. Clausen; *E*, J. L. Edwards; and *M*, K. K. Mackenzie.

ISOETES ENGELMANNI. A Br. Pfeiffer (1922) studied material from only three counties in New Jersey: Bergen, Camden, and Sussex. Small (1935) considered the species to be general in the vicinity of New York (including New Jersey), but specimens are not available to substantiate this belief. Actually the species is unknown from the pine-barrens and coastal region. Indeed, except for the specimens previously cited from Camden County, it seems to be absent from the coastal plain in New Jersey. Plants from Bennett, Cape May Co., are probably *I. melanopoda* Gay and Durieu.

Bergen Co.: Oradell, *M* 742 (NY). Camden Co.: reported by Pfeiffer (1922). Middlesex Co.: Iselin, *E & C* 1721 (Claus). Morris Co.: Denville, *E* (Claus, Edw); Pine Brook, *E* (Claus, Edw); Splitrock Pond *E* (Claus, Corn, Edw). Passaic Co.: Oak Ridge, *M* 3187 (NY); Pequannock, *M* 3803 (NY); Charlotteburg, *E. G. Britton* (NY); Greenwood Lake, *W. C. Mucnscher* and *O. F. Curtis, Jr.* 5379, 5380, and 5381 (Corn). Somerset Co.: Rock Mill, *E. T. Wherry* (Ph). Sussex Co.: Montague, *E & C* 163 (Claus, Edw); Lake Hopatcong and Wawayanda Lake, *vide* J. L. Edwards. Union Co.: *vide* J. L. Edwards. Warren Co.: above Phillipsburg, *M* 5170 (NY).

PELLAEA GLABELLA Mett. ex Kuhn. When Butters (1917) published on the status of *Pellaea glabella* he did not mention any records from New Jersey. Lewis (1924) reported it from the Highlands of the Delaware below Phillipsburg and other writers have referred to isolated collections in the northwestern part of the state, but no attempt has been made to summarize available data. Small (1935) stated that the species occurs throughout our range (including New Jersey), except the coastal plain, but the writer has seen specimens from only two counties in northwestern New Jersey. There the species is locally distributed wherever there are exposures of limestone. It sometimes occurs in association with *P. atropurpurea*, but at such localities usually grows in more exposed places on the cliffs than does its close relative.

Sussex Co.: limestone ledge along Walkill River near Owens, *E & C 62* (Claus, Corn, Edw), also *A. N. Leeds 571* (Ph); south of Springdale, *E & C 63* (Claus, Edw); south of Branchville, *A. N. L. 292* (Ph); northwest of Brighton, *A. N. L. 566* (Ph); east of Huntsburg, *A. N. L. 567* (Ph); south of Huntsburg, *A. N. L. 568* (Ph); northwest of Lafayette, *A. N. L. 570* (Ph); also six other stations, *vide* J. L. Edwards. Warren Co.: Johnsonburg, *E & C 1201* (Claus, Edw); also *A. N. L. 569* (Ph); Mud Pond, Stillwater, *M* (NY); also three other stations, *vide* J. L. Edwards.

PINUS RESINOSA Ait. Sussex Co.: summit of Breakneck Mt., 1400 ft., April 4, 1936, *E & C 2096* (BH, Corn). This seems to be the first record of the occurrence of the Red Pine in New Jersey.

**Pinus rigida** ssp. **serotina** (Michx.) n. comb. (*Pinus serotina* Michx., *Flor. Bor. Am.* 2: 205. 1803. *Pinus rigida* var. *serotina* Loud., *Arb. et Frut. Brit.* 4: 2242. 1838.) Long (1909) first recorded this pine from New Jersey, from the margin of a swamp about two miles northwest of Swedesboro, Gloucester County. His specimens had pale leaves, 15–20 cm. long, with the sheaths longer than in *P. rigida*, and with the spines of the cone-scales very minute and mostly deciduous.

The writer became interested in the taxonomic problem of the relationships of the Pitch and Pond Pines as the result of collecting specimens at West Cape May which were intermediate between

the two supposed species. This led to a review of herbarium specimens of New Jersey material available under the two names, also a survey of series of specimens from Massachusetts and intermediate states to Florida. Length of leaves and leaf-sheaths, nature of the prickles on the cone-scales, and geographical range have been the three most important characters for separating these two populations. Of these, range should be at once excluded as no basis for specific segregation. The nature of the prickles on the cone-scales is tremendously variable. In *P. rigida* the prickles are usually stated to be stout, while in *P. serotina* they are said to be small, slender, and deciduous, or obsolete. Actually, this criterion is impossible to apply. The writer has seen short-leaved specimens of *P. rigida* from Massachusetts and New York in which the prickles were very slender and mostly deciduous. He has also seen long-leaved specimens of *P. serotina* from coastal North Carolina in which the prickles were stout. In view of such a condition, this character, though perhaps indicating a tendency, is exceedingly difficult to use in making determinations of individual specimens.

Length of leaves remains as the best basis for identifying trees as *P. rigida* or *P. serotina*, but this character exhibits a geographical gradient, as shown in the following table.

	<i>No. of collections tions measured</i>	<i>Extremes in length</i>	<i>Average length</i>
Massachusetts <sup>1</sup> .....	7	5-12 cm.	7.9 cm.
Central New York .....	7	6-14	9.1
Southern New York .....	6	7-12	8.9
Northern New Jersey .....	4	5-11.5	9.3
Southern New Jersey .....	13	7-23	13.5
Maryland .....	3	8.5-14	11.8
North Carolina .....	6	8-17.5	13.9
South Carolina .....	3	10.5-18	15.4
Georgia .....	2	13-21	16.8
Florida .....	4	15.5-20	17.6

<sup>1</sup> Professor G. T. Hastings has recently sent to the writer leaf-clusters from trees at Cape Ann, Massachusetts, of which the extremes in length are 4.7 cm. and 14.2 cm. These exceed in both directions the measurements made in the above study.

The average for southern New Jersey is perhaps higher than it ought to be because more specimens from Cape May County

were measured than from elsewhere. Since from southern New Jersey southward there are trees with the leaves 15 cm. or more long and since this length previously has been used as the dividing line, it might be considered as the arbitrary median between the two populations which the writer prefers to consider as subspecies.

Length of sheaths<sup>2</sup> has been ignored because its variation seems directly proportional to the variation in the leaves. Sheaths subtending long leaves are proportionally longer than those subtending short leaves. As a taxonomic character in this group, sheath-length is really a repetition of leaf-length.

Specimens typical of ssp. *scrotina* have been seen from three counties in southern New Jersey. Cape May Co.: Cold Spring, *Bayard Long 5744* (Ph). Cumberland Co.: Ocean View, *Henry Fox* (Ph), this collection is on the border-line. Gloucester Co.: Swedesboro, *Bayard Long* (NY), also *B. H. Smith & C. D. Lippincott* (Ph).

Although specimens from low elevations from southern New Jersey to North Carolina collectively are intermediates, yet in any region there are likely to be trees which are more one way than the other. New Jersey collections which are in the middle, true intermediates, are cited from two counties. Cape May Co.: West Cape May, *W. C. Wilson, J. Tanner, and C 2349* (BH, Corn); Cape May Court House, *Witmer Stone 11742* (Ph); Nummytown, *S. S. Van Pelt & Witmer Stone* (Ph); Cold Spring, *O. H. Brown* (Ph); Dennisville, *W. Stone 7473* (Ph); Cape May Point, *C. A. Williamson* (Ph). Cumberland Co.: Dividing Creek, *F. W. Pennell 14870* (Ph).

POTAMOGETON ANGUSTIFOLIUS Berch. & Presl. Morris Co.: rooted on muddy bottom on west side of Budd Lake, *E, C, et al 1737* (Corn).

Taylor (1915) reported this only from Sussex and Warren Counties. The writer has seen no other New Jersey collections.

POTAMOGETON CAPILLACEUS Poir. Middlesex Co.: shallow backwater of Lawrence River about one mile southwest of Milltown, *E & C 1731*. Morris Co.: on sandy bottom at southern end

<sup>2</sup> In this discussion, only sheaths still intact are considered. The breaking away of the sheath in old leaf-clusters causes this character to vary tremendously, with the result that the oldest leaves may have the shortest sheaths. Statements made apply to leaf-clusters of the same age.

of Green Pond. *A. P. Clausen & C 1728*, also 1729. Passaic Co.: pool at base of Wolf Den Mt., Upper Mocopin, *E*.

From northern New Jersey, Fernald (1932) reported this species only from ponds near Milton and from Moosehead (?) Pond, Morris County.

POTAMOGETON PANORMITANUS var. MAJOR G. Fischer. Ocean Co.: brackish backwater, Mantoloking, *E & C 1402*.

Fernald (1932) reported this species from New Jersey only from Closter.

✓ *Sagittaria graminea* ssp. *Edwardsiana* (Clausen) n. comb. (*Sagittaria Edwardsiana* Clausen, in *Rhodora* 39: 30, 1937.) Two years of additional experience and further study of the genus *Sagittaria* have caused the writer to alter his opinion concerning the specific validity of *S. Edwardsiana*. The arrow-head of the New Jersey pine-barrens still seems distinctive, but the significance of its distinctness now appears less great to him than when he originally published the species. Examination of series of seeds of *S. graminea* indicates that these vary more than at first supposed and that those of *S. Edwardsiana* come within this range of variation. The foliage characters remain fairly satisfactory, although occasional intermediates with the typical *S. graminea* do occur. The habit, too, continues to appear significant and indicates that this population of the New Jersey pine-barrens can not lightly be disregarded as a deep-water form of *S. graminea*. Observation of abundant *S. graminea* in the lakes of northern New York, where one can see all stages, from plants on shore completely emersed to those under several feet of water, revealed no plants like those described by the writer. Plants in some of the outlets, under conditions very similar to those in southern New Jersey, never matched them in the succulent phyllodia, the absence of a rosette of flattened basal leaves, or the trailing habit. New York plants always stood up in the water, as does the var. *cycloptera* of Smith (1895), described from the southeastern states. Attempts to match *S. Edwardsiana* with that variety have been unsuccessful. Instead, the New Jersey population seems unique in the three characters mentioned above. Although its differences perhaps were originally the result of environmental influences, the writer ventures the opinion that it today represents a distinct

genetical race which takes the place of typical *S. graminea* in the region of the pine-barrens. Because of its geographical and ecological homogeneity, it now seems best to consider this population as a subspecies. Collections from along the Delaware River and from southern New Jersey outside the pine-barrens represent the typical race. Only a few specimens from these places are intermediate in character.

Collections additional to those cited with the original description of *S. Edwardsiana* are now listed. Atlantic Co.: Pleasant Mills, near mouth of Hammonton Creek, *Bayard Long 4658* (Ph). Burlington Co.: Wading River, *W. H. Leggett* (NY); swift flowing water, Batsto River n. n. w. of Quaker Bridge, *Bayard Long 7736* (Ph), also *7743* (Ph); *S. W. Conrad* (Ph). Gloucester Co.: Willow Grove near Newfield, *C. A. Gross* (Ph).

Intermediate specimens have been seen from two counties in New Jersey and from one in Pennsylvania. Burlington Co.: Delanco, *Bayard Long* (Ph) and *H. B. Meredith* (Ph). Camden Co.: Camden, *T. F. Seal* (Ph). Bucks Co.: Mud Island, Andalusia, *C. S. Williamson* (Ph).

ANACHARIS CANADENSIS (Michx.) Planchon. Although Taylor (1915) reported that he had seen no specimens of this species from our range, the writer has collected it or examined material from Middlesex, Morris, Passaic, and Warren Counties, also doubtful material from elsewhere.

PANICUM SPRETUM Schult. Passaic Co.: Clifton, field east of River Drive at Delawanna, *W. Marold* and *C 1221* (BH, Corn). The northernmost previous collection of this species in New Jersey was from Shark River Station, Monmouth Co., *M* (NY).

CAREX INCOMPERTA Bickn. Although cited from only Burlington, Morris, Passaic, and Union Counties by Taylor (1915) the writer has now seen or collected specimens in Camden, Cape May, Gloucester, Hunterdon, Mercer, Monmouth, Ocean, Salem, and Warren Counties.

CAREX BRUNNESCENS (Pers.) Poir. Morris Co.: Budd Lake, *W. D. Miller 509 & 510* (NY). Passaic Co.: moist woods in Allwood Swamp, Clifton, *G. S. & S. Yerbury* and *C 1782* (Claus). Taylor (1915) reported this only from Sussex County.

ERIOCAULON PARKERI B. L. Robinson. This is now known from tidal shores of back-waters and rivers at several places along the coast from Monmouth County to Atlantic County.

TRILLIUM UNDULATUM Willd. Warren Co.: low woods south of Sand Pond, *J. W. Large & C 1250* (Corn). This was reported by Taylor (1915) from Hudson, Passaic, and Sussex Counties.

RANUNCULUS PUSILLUS Poir. Passaic Co.: marsh west of Bloomfield Avenue at Allwood, Clifton, *G. S. Yerbury and C 1546* (Corn). Taylor (1915) reported this as rare and local in Morris and Essex Counties, increasing southward. There seem to be no previous collections from Passaic County.

RUBUS LACINIATUS Willd. Camden Co.: Camden, vacant lot, Kaighers Point, *N. B. Meredith* (NY). Hudson Co.: Secaucus, Snake Hill, *E, C et al 1909* (BH).

Taylor (1915) regarded this as a rare, hardly persisting escape. At Snake Hill, the species seemed well established and thriving.

VICIA VILLOSA Roth. Camden Co.: Camden, *G. W. Bassett* (NY). Cape May Co.: Cold Spring, *M 6981* (NY). Monmouth Co.: Farmingdale, *Norman Taylor 2186* (NY). Passaic Co.: in field at Allwood, Clifton, *G. S. & S. Yerbury & C 1916* (Corn). Taylor (1915) reported this as a waif.

LUDWIGIA SPHAEROCARPA Ell. (var. TYPICA). Sussex Co.: Hopkins Corners,  $3\frac{1}{2}$  miles n. n. e. of Lafayette, *C & E 3531* (BH, Corn); shallow water, Decker Pond, *M 7274* (NY).

Taylor (1915) reported this as rare in Bergen and Morris Counties, increasing southward. At Hopkins Corners, the species grew in water one foot deep, at the northern end of a pond-like marsh in a limestone depression, in association with *Scirpus Torreyi* Olney, *Rynchospora macrostachya* Torr., and *Mariscus mariscoides* (Muhl.) Kuntze.

MYRIOPHYLLUM HUMILE (Raf.) Morong. Essex Co.: in a pond about one mile west of Millburn, *M 290* (NY). Morris Co.: southern end of Green Pond, *A. P. Clausen & C 1945* (Corn); Mt. Arlington, *M 874 & 891* (NY).

Like *Potamogeton capillaceus*, this species has been considered as rare and local in northern New Jersey.

✓ VERBENA BRACTEATA Lag. & Rodr. Sussex Co.: in cinders along railroad  $\frac{1}{2}$  mile south of White Lake, Sparta Township, C & E 3538 (BH, Corn). Taylor (1915) reported this as a waif. Perry (1933) cited specimens from Weehawken and Camden, from both of which localities the writer also has seen material.

UTRICULARIA MINOR L. Warren Co.: pool at Johnsonburg, June 16, 1934, E & C 1289 (Corn). This collection unfortunately is sterile, but closely matches authentic material from elsewhere. The species has not previously been recorded from the state.

LONICERA CANADENSIS Marsh. Sussex Co.: along brook in moist hemlock woods between Wawayanda Lake and Moe, E & C 1294 (BH, Corn).

Taylor (1915) stated that this had been reported, but was not definitely known, from Warren Co., and was otherwise unknown. Specimens are now available (NY) from Cedar Pond and east of Moe, Passaic County, and from Kampe and Wawayanda Lake, Sussex County. These represent collections of K. K. Mackenzie and W. D. Miller. The writer has seen no specimens from Warren County.

HIERACIUM FLORENTINUM All. Passaic Co.: edge of field at southwest corner of Allwood Swamp, Clifton, G. S. & S. Yerbury & C 2012 (Corn).

This was reported by Taylor (1915) as locally rare as an occasional weed. In addition to the collection cited, the writer has seen specimens from Bergen, Hudson, and Somerset Counties.

PRENANTHES RACEMOSA Michx. Morris Co.: roadside at Two Bridges, A. P. Clausen & C 992 (Corn). This species has otherwise been reported only from Bergen and Hudson Counties.

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### Notes on a Semi-arid Region in the Aguan River Valley, Republic of Honduras\*

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The Republic of Honduras, or Spanish Honduras as it is sometimes called to distinguish it from the crown colony of British Honduras, is situated near the geographical center of Central America. It extends across the continent from the Gulf of Fonseca on the Pacific to the Caribbean Sea where the more extensive coast line extends in a generally east-west direction and offers better harbor facilities.

The country has an area of about 46,000 square miles and, in common with the other Central American countries, exhibits a great variety of physiographic features. Along the Caribbean and, to a limited extent, about the Gulf of Fonseca is a low, sometimes marshy, region which varies from a very narrow strip where the mountains occasionally reach the sea to several miles in width. This coastal plain reaches its greatest width in the so-called Mosquitia Territory at the east and also extends inland along the main river courses, especially the Ulua and the Aguan. Excepting this low coastal plain the country is very rough and mountainous. From the plain the land may rise gradually in a series of foothills and plateau-like plains or the ascent may be rapid and abrupt with few or no foothills. The highest mountains are to be found

\* I am indebted to Mr. L. A. Richardson of the Standard Fruit Company at La Ceiba, Honduras, for data relative to rainfall, geology of the valley, etc.